Name:

at1124exam: Radicals and Squares (v818)

Question 1

Simplify the radical expressions.

$\sqrt{28}$ $\sqrt{98}$ $\sqrt{75}$

$\sqrt{2 \cdot 2 \cdot 7}$ $\sqrt{7 \cdot 7 \cdot 2}$ $\sqrt{5 \cdot 5 \cdot 3}$

$2\sqrt{7}$ $7\sqrt{2}$ $5\sqrt{3}$

Question 2

Find all solutions to the equation below:

$$\frac{(x-10)^2}{2} + 5 = 37$$

First, subtract 5 from both sides.

$$\frac{(x-10)^2}{2} = 32$$

Then, multiply both sides by 2.

$$(x-10)^2 = 64$$

Undo the squaring. Remember the plus-minus symbol.

$$x - 10 = \pm 8$$

Add 10 to both sides.

$$x = 10 \pm 8$$

So the two solutions are $x = 18$ and $x = 2$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 12x = 64$$

$$x^2 + 12x + 36 = 64 + 36$$
$$x^2 + 12x + 36 = 100$$
$$(x + 6)^2 = 100$$
$$x + 6 = \pm 10$$
$$x = -6 \pm 10$$
$$x = 4 \quad \text{or} \quad x = -16$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 3x^2 - 24x + 53$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 3 .

$$y = 3(x^2 - 8x) + 53$$

We want a perfect square. Halve -8 and square the result to get 16 . Add and subtract that value inside the parentheses.

$$y = 3(x^2 - 8x + 16 - 16) + 53$$

Factor the perfect-square trinomial.

$$y = 3((x - 4)^2 - 16) + 53$$

Distribute the 3.

$$y = 3(x - 4)^2 - 48 + 53$$

Combine the constants to get **vertex form**:

$$y = 3(x - 4)^2 + 5$$

The vertex is at point $(4, 5)$.